Claims

What is claimed is:

1. (currently amended) A tunable low noise amplifier matching circuit system comprising:

~~a ferro-electric tunable component;~~

a low noise amplifier matching circuit comprising ~~the~~ a ferro-electric tunable component, having a ferro-electric material with an electrically tunable dielectric constant;

a control line operably coupled to the ferro-electric component;
a control source electrically coupled to the control line, the control source configured to transmit a control signal on the control line;

wherein the ferro-electric component, responsive to the control signal, adjusts the impedance of the matching circuit.

2. (currently amended) The tunable low noise amplifier matching circuit system of claim 1, further comprising a low noise amplifier coupled to the matching circuit.

3. (currently amended) The tunable low noise amplifier matching circuit system of claim 1, wherein the ferro-electric tunable component comprises a ferro-electric tunable capacitor.

4. (currently amended) The tunable low noise amplifier matching circuit system of claim 3, further comprising a substrate wherein the capacitor is

directly mechanically coupled to the substrate and the low noise amplifier is directly mechanically coupled to the substrate.

5. (currently amended) The tunable low noise amplifier matching circuit system of claim ~~1~~ 3, wherein the matching circuit comprises:

an inductor, one end of the inductor ~~comprising~~ connected to an input port of the matching circuit;

the ferro-electric tunable capacitor coupled to the inductor and to the input port;

a second inductor coupled to the ferro-electric tunable capacitor and to a third inductor;

wherein the second and third inductors are configured to be coupled to a low noise amplifier.

6. (currently amended) The tunable low noise amplifier matching circuit system of claim 1, wherein the matching circuit is configured to minimize a noise figure of a low noise amplifier at a preselected frequency.

7. (currently amended) The tunable low noise amplifier matching circuit system of claim 6, wherein, responsive to the control signal, the ferro-electric tunable component tunes the frequency.

8. (currently amended) A wireless communication device comprising:

a battery;

a transceiver;

a user interface;

a housing encasing the battery and the transceiver and adapted to present the user interface external to the housing;

a low noise amplifier ~~amplifier~~;

~~a ferro-electric tunable component coupled to the low noise amplifier;~~

a low noise amplifier output matching circuit comprising a ferro-electric tunable component, coupled to the low noise amplifier, having an impedance and ~~comprising the ferro-electric tunable component~~ having a ferro-electric material with an electrically tunable dielectric constant;

a control signal generator for generating a control signal;

a control line coupled to the control signal generator and to the ferro-electric component;

a control source electrically coupled to the control line, the control source configured to transmit a control signal on the control line;

wherein the ferro-electric component, responsive to the control signal, adjusts the impedance of the matching circuit.

9. (currently amended) The ~~low noise amplifier matching circuit~~ wireless communication device of claim 8, further comprising a low noise amplifier coupled to the matching circuit.

10. (currently amended) The ~~tunable low noise amplifier matching circuit~~ wireless communication device of claim 8, wherein the ferro-electric tunable component comprises a ferro-electric tunable capacitor.

11. (currently amended) The ~~tunable low noise amplifier matching circuit~~ wireless communication device of claim 10, further comprising a substrate

wherein the capacitor is directly mechanically coupled to the substrate and the low noise amplifier is directly mechanically coupled to the substrate.

12. (currently amended) The ~~tunable low noise amplifier matching circuit~~ wireless communication device of claim 8, wherein the matching circuit comprises:

an inductor, one end of the inductor ~~comprising~~ connected to an input port of the matching circuit;

the ferro-electric tunable capacitor coupled to the inductor and to the input port;

a second inductor coupled to the ferro-electric tunable capacitor and to a third inductor;

wherein the second and third inductors are configured to be coupled to a low noise amplifier.

13. (currently amended) The ~~low noise amplifier matching circuit~~ wireless communication device of claim 8, wherein the matching circuit is configured to minimize a noise figure of ~~a~~ the low noise amplifier at a preselected frequency.

14. (currently amended) The ~~low noise amplifier matching circuit~~ wireless communication device of claim 13, wherein, responsive to the control signal, the ferro-electric tunable component tunes the frequency.

15. (New) A method of tuning a low noise amplifier matching circuit, the method comprising the steps of:

applying an electric field to a ferro-electric tunable component, the ferro-electric tunable component comprising a ferro-electric material having an electrically tunable dielectric constant;

changing the electrically tunable dielectric constant of the ferro-electric material, responsive to the step of applying the electric filed to the ferro-electric tunable component; and

tuning an impedance match of the low noise amplifier matching circuit, responsive to the step of changing the electrically tunable dielectric constant of the ferro-electric material.

16. The method of claim 15, further comprising the steps of:

minimizing a noise figure of the low noise amplifier at a first frequency; and

minimizing the noise figure of the low noise amplifier at a second frequency, responsive to the step of tuning the impedance match of the low noise amplifier matching circuit.

17. The method of claim 16, further comprising the step of:

receiving a wireless communication band selection signal, and wherein the step of applying the electric field to the ferro-electric tunable component is responsive to the step of receiving the wireless communication band selection signal.

18. The method of claim 16, further comprising the step of:

receiving a temperature change indication, and wherein the step of applying the electric field to the ferro-electric tunable component is responsive to the step of receiving the temperature change indication.

19. The method of claim 15, further comprising the step of:

receiving a wireless communication band selection signal, and wherein the step of applying the electric field to the ferro-electric tunable component is responsive to the step of receiving the wireless communication band selection signal.

20. The method of claim 15, further comprising the step of:

receiving a temperature change indication, and wherein the step of applying the electric field to the ferro-electric tunable component is responsive to the step of receiving the temperature change indication.